

Effects of dietary micronutrients on health status in children

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It is well established that micro-nutrients are essential for growth and development in both children and adults. In food insecure countries in Africa, Asia and South America, the prevalence of micro-nutrient deficiencies notably, vitamin C, Zinc (Zn), and Iron (Fe) in children is particularly high. It is probable that micro-nutrient deficiency may result from inadequate dietary intake or indeed to poor absorption and utilization (bio-availability). We have investigated the effects of dietary micro-nutrients on health status and well-being in children.

Children (n=129; age, 4.13 ± 0.07 years) living in Benin – City, Nigeria were randomly selected from 7 clusters in a nutrition and health study programme. Anthropometric and clinical parameters were evaluated using accepted criteria. The children were then classified into normal (control) and malnourished categories. Levels of food intake and micro-nutrients in diets were assessed using food frequency questionnaires and analysed using the diet 5 computer package. Medical history (measles, 'common cold' and diarrhoea) since the birth of these children were recorded. Table 1 shows that, the dietary intake of vitamin C, Zn and Fe as well as the anthropometric indicators (height for age, HFA; weight for age, WFA; weight for height, WFH) were significant lower ($P < 0.05$) in the malnourished children compared with the control group. Moreover, the incidence of measles, 'common cold' and diarrhoea in the malnourished group were markedly increased compared with the normal group. Protein and energy intake were significantly higher in the control.

Table 1 shows the incidence of diseases (%), dietary intake of vit. C, Zn and Fe, Protein (g), Energy (kcal) and anthropometric indicators (Z-scores) for the control and malnourished children.

	Incid. of measles	Incid. of Comm-on cold	Incid. of Diarrhoea	Zn mg/day	Vit. C mg/day	Fe mg/day	Total Prot g/day	Energy kcal/day	HFA Z-sc	WFA Z-sc	WFH Z-sc
Norm n=83	27%	44%	8%	4.89±0.08*	145.67±3.01*	10.13±0.19*	40.34±0.66*	1514.40±21.84*	-0.33±0.12*	-0.81±0.09*	-0.71±0.09*
Mal. n=46	52%	76%	28%	3.97±0.14*	112.76±4.56*	8.42±0.31*	33.58±1.10*	1157.28±35.04*	-1.29±0.23*	-1.71±0.13*	-1.19±0.14*

*indicates sig. differences ($P < 0.05$) between normal and malnourished group.

In general, the anthropometric parameters and nutrients investigated showed lower values for malnourished children compared with controls. These findings suggest that while the amount of nutrient intake may be an important contributing factor, it is probable that compromised immune system brought on by poor absorption of Zn and Fe due to low protein and reduced antioxidants may lead to cellular damage. This may have further resulted in reduced intestinal absorption and subsequent utilization of nutrients.